

POSTER ABSTRACT

## Cyclododecane as temporary protection on distemper wall paintings prior to plaster consolidation: the temple restoration project in Sikkim

Mélodie Bonnat



**Figure 1** Detail of the Guru Lakhang paintings in Singhik monastery (North Sikkim, India) during plaster consolidation. CDD has been applied in solution to protect the paintings during grout injection, then padded tools are applied after the injection. Image: Mélodie Bonnat.



**Figure 2** View of the Kangyur Lakhang paintings in Singhik monastery after plaster consolidation. The CDD has totally sublimed after one month. Image: Mélodie Bonnat.

Cyclododecane (CDD) is a volatile product that was successfully used by wall painting conservators during conservation of wall paintings in the Hee Gyathang and Singhik temples in 2014 and 2015. Taken from published experience of similar

techniques used in the archeological conservation of murals, this technique was used for the first time in Sikkim, northern India. In this region, restoration projects have been taking place since the Buddhist-built heritage suffered from a severe earthquake in September 2011. Developing an adequate and ethical restoration method adapted to the artefact's characteristics is a challenge, considering the unique context of the project.

One of the notable features of the Hee Gyathang restoration project is that it is located in a remote and well-preserved place, in Dzongu area, North Sikkim District. In this village, the rural community decided to conserve their temple instead of rebuilding it. Started in 2011, the project includes consolidation of the walls, restoration of the roof and some improvement work. Foreign professionals have been contacted to carry out the mural conservation work. An equivalent scenario occurred in Singhik, where the government was also involved together with the community. This very specialised work was only possible thanks to the availability of a conservation products supplier in Delhi (CTS), which has been present in India since 2012.

The second feature of the project which made cyclododecane necessary is that the murals are matte – luckily not varnished, unlike some Sikkimese paintings. Most Sikkimese temples built after the seventeenth century are decorated with religious murals, traditionally painted with animal glue mixed with pigments and applied on earthen plasters. The hydrophilic characteristics of these materials set strict parameters for the conservator, who must limit water and abrasion throughout the restoration process. The presence of a varnish may allow the use of Japanese paper glued with methyl

cellulose as a protection, but this is impossible on unvarnished surfaces.

However, temporary protection is absolutely necessary in order to proceed safely to plaster consolidation. Due to strong vibrations from earthquakes, plasters are commonly detached from the wall so consolidation is necessary. Grout injection is a delicate consolidation method: grouts are finely sieved liquid mortars based on soil or lime, that are injected with manual syringes between plaster and wall. It is crucial to avoid grout leaks at the surface of the original paintings, since stains from grout on matte paint are almost impossible to clean. In order to protect the paintings, cyclododecane (from CTS Delhi) was tested. It was prepared in saturated solution with cyclohexane (from Central Drug House, Delhi), slightly heated in a convenient electrical baby milk bottle heater and applied with a smooth brush on the paintings (**Figure 1**). During this operation, the conservator wears appropriate mask and gloves. The cyclododecane layer was very thin and almost transparent but thick enough to repel grout leaks (PLM-A from CTS) and protect the paint layer during the grout injection. After three days, the cyclododecane was totally sublimed, having protected the decorated surface from all residues and successfully preserved the matte and bright appearance of the paint layer (**Figure 2**).

The temporary protection of water soluble murals with volatile CDD was a good alternative to Japanese paper and methyl cellulose. The product seemed to behave acceptably on glue-based matte painting in a relatively humid and temperate climate and could be used for future conservation projects of unvarnished matte murals.

Further information about the use of cyclododecane during the Singhik Conservation Project can be found on the project website:

<https://singhikconservationproject.wordpress.com/process/murals-restoration-process/structure-restoration-process/temporary-protection-with-cyclododecane/>

### Biography

**Mélodie Bonnat** is a French painting conservator. She graduated from the Institut national du patrimoine in Paris in 2010 and from the Université de Paris I Panthéon-Sorbonne in heritage and cultural artefacts conservation–restoration studies in 2011. She studied restoration of oil paintings and murals, and developed a special interest in the conservation of painted mud plasters, in museums as well as in situ, and in an archaeological context as well as in living heritage sites. She has worked in the Himalayas regularly since 2009 and has participated in several painting conservation projects in France China, India and Uzbekistan.

Email: [melodiebonnat@gmail.com](mailto:melodiebonnat@gmail.com)